

## Wednesday 15 January 2025 – Afternoon

### Level 3 Cambridge Technical in Applied Science

#### 05874 Unit 22: Global scientific information

Time allowed: 1 hour 30 minutes

C343/2501



**You must have:**

- the Insert (inside this document)
- a ruler (cm/mm)

**You can use:**

- a scientific or graphical calculator
- an HB pencil



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

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Candidate number

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First name(s)

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Last name

---

Date of birth

D	D	M	M	Y	Y	Y	Y
---	---	---	---	---	---	---	---

### INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Answer **all** the questions.
- Write your answer to each question in the space provided. You can use extra paper if you need to, but you must clearly show your candidate number, the centre number and the question numbers.
- Use the Insert to answer the questions in Section A.

### INFORMATION

- The total mark for this paper is **60**.
- The marks for each question are shown in brackets [ ].
- This document has **12** pages.

### ADVICE

- Read each question carefully before you start your answer.

**Section A**

Use the case study sources in the **Insert** to answer the questions in this section.

**1** The types of scientific information shown in **Sources A** and **B** can be classified.

**(a)** The table shows some classifications of information.

<b>Category</b>	<b>Letter</b>
Public	A
Sensitive	B
Private	C
Confidential	D
Classified	E

Use the table to identify the following classifications.

Write **one** letter **A**, **B**, **C**, **D**, or **E** to classify each statement.

You may use each letter once, more than once or not at all.

**(i)** The names of the 50 countries that participate in the ICP Vegetation Programme.

..... **[1]**

**(ii)** The personal contact details of the 250 scientists that participate in the ICP Vegetation Programme.

..... **[1]**

**(iii)** The economic impact of ozone pollution on crop yields.

..... **[1]**

**(iv)** Air quality monitoring data.

..... **[1]**

(b) Scientific knowledge can have an impact on many industries, in this case agriculture. This information can contribute to:

- the knowledge needed to develop the industry
- the process involved
- the products.

(i) With reference to **Source A** give **three** examples of the impact of knowledge.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) With reference to **Source B** give **three** examples of the different processes outlined under the heading 'What is needed?'.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(iii) With reference to **Source C** give **two** examples of different products used to monitor air pollution.

1 .....

.....

2 .....

.....

[2]

- (c) Scientific information is found in **Sources A, B and C**. Some of this information, but not all, could require further investigation.

Which **four** of the following statements could act as a sound basis for further investigation?

Tick (✓) **four** boxes.

An air quality monitoring network that is validated for accuracy and precision.

Cities such as London, Paris and Perth have worked with 'Clarity' to implement hybrid, low-cost ambient air quality monitoring networks.

Current crop varieties tend to be more sensitive to ozone than older varieties.

Ground level ozone is a threat to food production.

Ozone concentrations are rising in developing areas of the world.

Policies on air pollution and climate change must be integrated.

Results from ICPs and task forces are used in the development of Protocols.

Scientists can explain how ozone damages crops.

[4]

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**DO NOT WRITE ON THIS PAGE**

**Turn over for the next question**

2 The 'Clarity' website has the following information about its data visualisation software.

The 'Clarity' Dashboard is a web app for managing and visualising air quality data.

Users log in with their unique account credentials to manage air quality monitors and view, plot and download current and historical raw and calibrated data.

The software allows users to:

- configure, manage and check the status of the air quality sensor
- view, plot and download raw or calibrated data
- assign user roles for access to sensor management and/or data analysis.

Source: <https://www.clarity.io/air-quality-monitoring-solution#ClarityCloud>

(a) The 'Clarity' Dashboard app is not protected by patent protection legislation.

Explain why. Use ideas about how software functions to support your answer.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

.....

[4]

(b) Suggest **two** pieces of information that users must provide to log in with their 'unique account credentials'.

1 .....

2 .....

[2]

(c) The data visualisation software allows 'user roles' to be assigned.

Use the following list of words to complete the sentences.

You may use each word once, more than once or not at all.

**access**                      **accountability**                      **compatibility**                      **compliance**

**controller**                      **manager**                      **prevention**                      **protection**

Different individuals require different levels of .....  
to data. Under the Data ..... Act and GDPR  
organisations assign a data ..... whose  
responsibility is to ensure and demonstrate .....  
with the legislation.

[4]

(d) 'Clarity' air quality sensors are connected in a network to the Internet of Things (IoT).

Which of the following reasons relate to the **integrity** of the network?

Tick (✓) **three** boxes.

Data is encrypted before transmission.

Data is protected from unauthorised modification.

Ozone sensors absorb ultraviolet light at 254 nm.

Particulate matter and nitrogen dioxide sensors are FCC/CE certified.

Sensors operate remotely.

The sensors are solar powered and fitted with global cellular communications.

[3]

(e) State the name of the legislation used by individuals and organisations to obtain information about the activities of public authorities that relate to or affect the environment.

..... [1]

**Section B**

You do **not** need the case study to answer these questions.

**3** Articles 9 and 21 of an international convention aim to remove barriers to the accessibility of information, communication and services.

**(a)** State the name of this convention.

.....  
..... [1]

**(b)** Interaction and navigation are two of the barriers to accessibility.

**(i)** Explain what is meant by 'navigation' when using a computer system.

.....  
..... [1]

**(ii)** Suggest **two** ways that computer systems can be designed to reduce the barriers to interaction and navigation.

1 .....

2 .....

[2]

**(c)**  
**(i)** Describe **one** other barrier to accessibility.

.....  
..... [1]

**(ii)** Suggest how computer systems are designed to reduce the barrier described in **(c)(i)**.

.....  
..... [1]

- 4 Choose words or phrases from the list to complete the sentences about locations of information and categories of information holder.

Each word or phrase must only be used once when answering 4(a) to 4(j).

**academic journals**

**archives**

**cloud services**

**databases**

**electronic devices**

**government agencies**

**individuals**

**international bodies**

**libraries**

**organisations**

- (a) ..... are publications that contain scholarly research and information on a particular field or subject. [1]
- (b) Computers, smartphones, tablets and other digital devices are ..... that store and process information. [1]
- (c) ..... are institutions or locations that store and provide access to a wide variety of information, including books, journals and other documents. [1]
- (d) ..... are collections of information that are organised in a structured manner for easy retrieval and analysis. [1]
- (e) ..... are online platforms and services that provide storage and access to digital information. [1]
- (f) ..... are people who possess information in their personal and professional capacity. [1]
- (g) ..... are bodies that collect and store information related to public policy, regulations and law enforcement. [1]
- (h) Companies and non-profit groups are ..... that collect, store and use information. [1]
- (i) ..... are groups of governmental and non-governmental bodies from different countries that implement and monitor the impacts of treaties and protocols towards the achievement of common goals. [1]
- (j) ..... are repositories that hold historical records, including photographic and audiovisual materials. [1]



**6** The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) places a legal duty on employers, self-employed people and people in control of premises to report when there has been an accident which caused an injury, an accident that was work-related or where the injury is of a type which must be reported.

**(a)** State **two** impacts of unauthorised persons gaining access to these reports.

1 .....

2 ..... **[2]**

**(b)** Describe **four** methods of reducing the risk of these reports being accessed by unauthorised persons.

1 .....

2 .....

3 .....

4 ..... **[4]**

**(c)** Confidentiality is a principle of information security.

Explain what is meant by confidentiality.

.....

..... **[2]**

**END OF QUESTION PAPER**

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